ORDER NO. AD8806149C2

Service Manual

Tuner

QUARTZ Synthesizer
AM/FM Stereo Tuner

ST-X930

Color

(K).....Black Type

Area

Color	Area
(K)	(EG).....F.R.Germany.
(K)	(Ei) .....Italy.

SPECIFICATIONS

(DIN 45 500)

■ FM TUNER SECTION

Frequency range	87.50 ~ 108.00 MHz (50 kHz-steps)
Sensitivity	1.5 µV (IHF, usable)
S/N 30 dB	1.3 µV (75Ω)
S/N 26 dB	1.2 µV (75Ω)
S/N 20 dB	0.9 µV (75Ω)
IHF 46 dB stereo quieting sensitivity	28 µV / 75Ω
Total harmonic distortion	
MONO	0.15%
STEREO	0.3%
S/N	
MONO	70 dB (78 dB,IHF)
STEREO	65 dB (71 dB,IHF)
Frequency response	20 Hz ~ 15 kHz,(+0.5 dB ~ -2.0 dB)
Alternate channel selectivity	
±400 kHz	70 dB
Capture ratio	1.0 dB
Image rejection at 98 MHz	90 dB
IF rejection at 98 MHz	90 dB
Spurious response rejection at 98 MHz	90 dB
AM suppression	55 dB
Stereo separation	
1 kHz	40 dB
Carrier leak	
19 kHz	-70 dB (-80 dB,IHF)
38 kHz	-75 dB (-80 dB,IHF)
Channel balance (250 Hz ~ 6,300 Hz)	± 1.2 dB
Limiting point	1.0 µV
Bandwidth	
IF amplifier	180 kHz
FM demodulator	1000 kHz
Antenna terminals	75Ω (unbalanced)

■ AM TUNER SECTION

Frequency range	522 kHz ~ 1611 kHz (9 kHz-steps) 530 kHz ~ 1620 kHz (10 kHz-steps)
Sensitivity (S/N 20 dB)	20 µV,300 µV/m
Selectivity (± 9 kHz)	
(at 999 kHz)	55 dB
Image rejection	
(at 999 kHz)	40 dB
IF rejection	
(at 999 kHz)	60 dB

■ GENERAL

Output voltage	0.5V (1.0V,IHF)
Power consumption	9W
Power supply	AC 50 Hz/60 Hz,220V
Dimensions (W x H x D)	360 x 64.5 x 288 mm (14-3/16″ x 2-17/32″ x 11-11/32″)
Weight	2.0 kg (4.4 lb.)

Notes:
1.Specifications are subject to change without notice. Weight and dimensions are approximate.
2.Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).

Technics

Matsushita Electric Industrial Co., Ltd.
Central P.O. Box 288, Osaka 530-91, Japan

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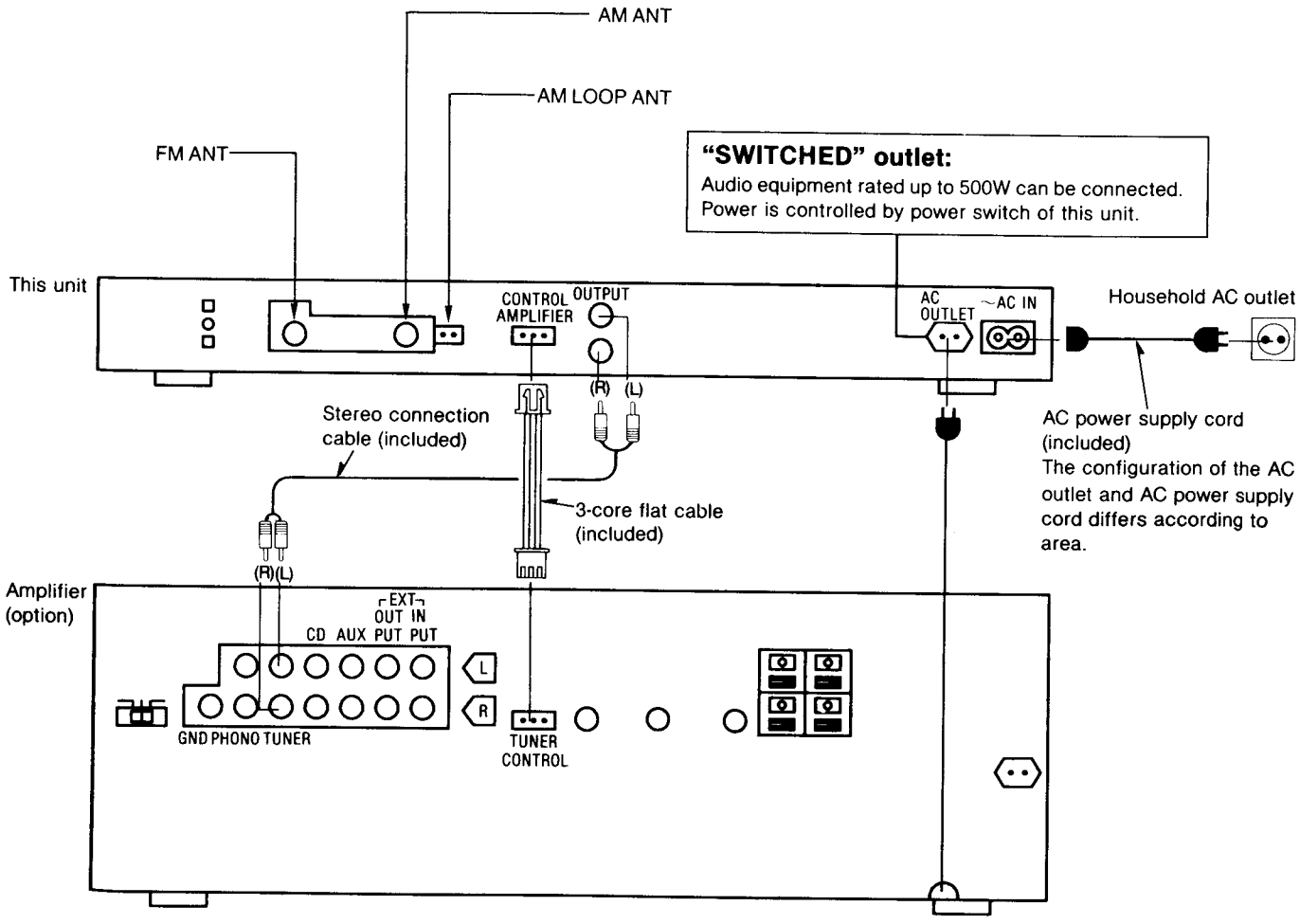
■ CONNECTION



ORDER NO. AD8806149C2-A

QUARTZ Synthesizer
AM/FM Stereo Tuner

DEUTSCH

ST-X930

■ MESSUNGEN UND JUSTIERUNGEN

UKW JUSTIERUNGEN

Einstellungen der Bedienelemente und zu verwendende Geräte.

- UKW-Messender(UKW-MS)
- Stereo-Modulator
- Verzerrungs-Analystator
- Elektronische Gleichstrom-Voltmeter(EVM)
- Frequenzzähler
- Drosselspule(100μH)
- Widerstand(100kΩ)

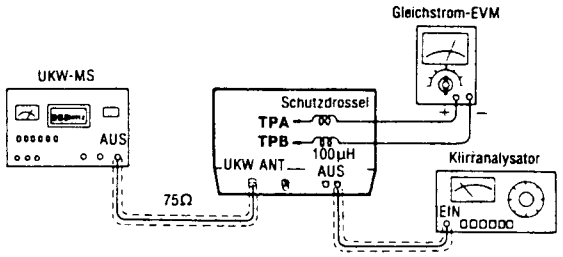
Anmerkung: Für Z202 und Z251 werden bereits justierte Ersatzteile geliefert. Die Kerne dieser Teile daher nicht drehen.

UKW-MONO-VERZERRUNGS-JUSTIERUNG

1.Der Testaufbau ist in der Abbildung gezeigt.
2.Stellen Sie die Einheit auf **"FM(UKW)"** Betrieb.
3.Die Radiofrequenzanzeige und den Messender auf **100.10MHz** einstellen.
4.Den Kern von **T201** so justieren, daß die im Signalzustand gemessene Spannung **0mV (0±20mV)** im 300mV-Bereich beträgt.
5.**T202** so justieren, daß der Verzerrungsfaktor des linken Kanals minimal wird.
6.Schritte 4 und 5 einige Male wiederholen.
7.Versichern Sie sich, daß die Verzerrungsfaktoren von Kanal L und Kanal R annähernd gleich sind und auf ein Minimum gehalten sind.

Anmerkung:
Für die Justierung ist ein Schraubendreher aus Kunststoff zu verwenden.

ZUSTAND DES UKW-MESSENDERS
Modulation 100%
Modulationsfrequenz 1kHz
Ausgangspegel 66dB



TPA = TP201 , TPB = TP202

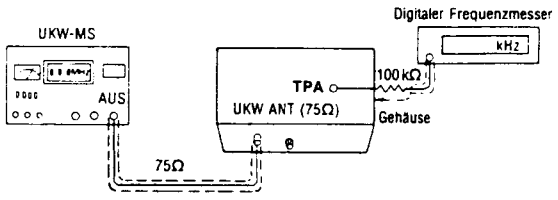
MPX-SGO-JUSTIERUNG

1.Der Testaufbau ist in der Abbildung gezeigt.
2.Den UKW-Bertriebsart-Wahlshalter in die **"on/auto"** Position stellen.
3.Radio und Meßsender auf **100.10MHz** einstellen.
4.**VR301** auf **19kHz ± 30Hz** auf der Frequenzzähleranzeige justieren.

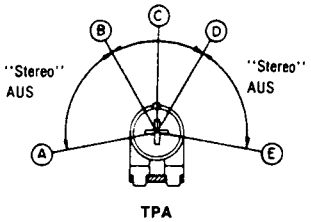
● VERWENDUNG EINES ALTERNATIVSYSTEMS

1.Stereosignal vom Meßsender eingeben oder eine Stereo-Sendung empfangen.
2.**VR301** justieren, bis die Stereo-Anzeige aufleuchtet. Den Arm von **VR301** mit Lack sichern, wie in der Abbildung gezeigt.

ZUSTAND DES UKW-MESSENDERS
Modulation 100%
Modulationsfrequenz 0kHz
Ausgangspegel 66dB



TPA = TP301



TPA

Ⓐ−Ⓑ,
Ⓓ−Ⓔ..... "Stereo" AUS Stellung
Ⓑ−Ⓓ..... "Stereo" EIN Stellung (Anzeigebeleuchtung)
Ⓒ..... Einstellpunkt des pilotschaltkreis'

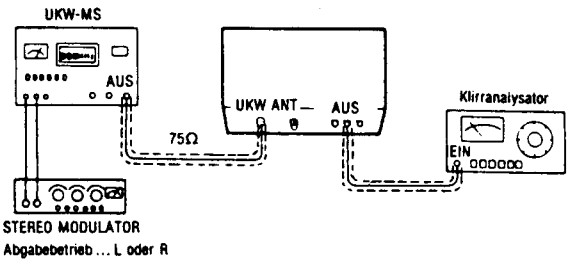
TPA = VR301

UKW STEREO KLIRRFAKTOR-JUSTIERUNG

1.Der Testaufbau ist in der Abbildung gezeigt.
2.Stellen Sie die Einheit auf **"FM(UKW)"** Betrieb.
3.Die Radiofrequenzanzeige und den Messender auf **100.10MHz** einstellen.
4.**T1** so justieren, daß der Verzerrungsfaktor des linken Kanals minimal wird.
5.überprüfen, daß die Verzerrungsfaktoren des linken und rechten Kanals fast gleich sind.

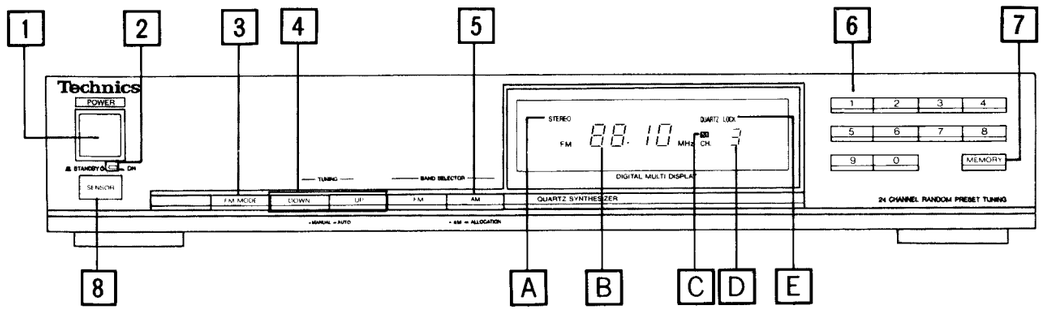
Anmerkung:
Für die Justierung ist ein Schraubendreher aus Kunststoff zu verwenden.

ZUSTAND DES UKW-MESSENDERS
Modulation .....”L”order ”R” Betriebsart 90%,Pilotssignal 10%
Modulationsfrequenz .....1kHz(Pilot 19kHz)
Ausgangspegel 66dB



Printed in Japan
F880602097 TW

■ LOCATION OF CONTROLS



Control section

[1] Power "STANDBY ⏻/ON" switch (POWER "STANDBY ⏻/ON")

This switch switches ON and OFF the secondary circuit power only. The unit is in the "STANDBY" condition when this switch is set to the "STANDBY ⏻" position. Regardless of the switch setting, the primary circuit is always "live" as long as the power cord is connected to an electrical outlet.

[2] "STANDBY ⏻" indicator

This indicator will illuminate when the unit is switched to the standby condition by the power "STANDBY ⏻/ON" switch on the unit or the ON/OFF switch on the remote-control unit.

[3] FM mode selector (FM MODE)

This unit automatically switches to the stereo mode when a stereo broadcast is received. Press this selector to listen in the monaural mode. The FM stereo indicator will not illuminate in the monaural mode.

[4] Tuning buttons (TUNING)

If the button is pressed momentarily and then released, the frequency will change at intervals of 0.05 MHz for FM and 9 kHz (or 10 kHz) for AM.

[5] Band selector

FM:
Press this button for FM reception.
AM:
Press this button for AM reception.
ALLOCATION:
If the AM button is kept depressed for about 3 seconds, the raster of the AM frequency will be set to 10 kHz. (Before the transmission it was set to 9 kHz.) To return to the previous frequency, keep this button depressed for 3 seconds again.

[6] Preset-tuning buttons (1 ~ 0) (24 CHANNEL RANDOM PRESET TUNING)

These buttons are used to preset FM and AM broadcast frequencies into the memory of this unit, and are also pressed to select the desired preset frequencies.

[7] Memory button (MEMORY)

[8] Remote-control signal receptor (SENSOR)

Display section

[A] FM stereo indicator (STEREO)

This indicator automatically illuminates when an FM stereo broadcast is being received.
Note:
It will not illuminate if the FM mode selector is set to the monaural mode.

[B] Digital frequency display

[C] Memory indicator ([M])

[D] Channel display

[E] Quartz-lock indicator (QUARTZ LOCK)

This indicator illuminates when tuned precisely to an FM or AM station.

●REMOTE CONTROL TRANSMITTER (EUR64753)

For detailed information concerning operation steps, etc., please refer to the appropriate page for each unit and the respective operation instructions.
For this system, you can listen to the tapes or compact discs, etc. by operating the remote-control transmitter without pressing the amplifier's input selector.

Note: The control panel of the remote-control transmitter may be covered by a clear plastic protective sheet. This sheet may be removed if desired.

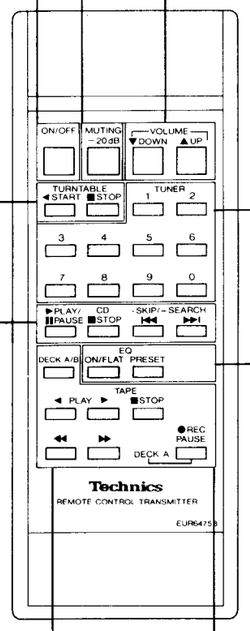
Before beginning

Make sure that the power "STANDBY ⏻/ON" switch of the tuner is set to the "ON" position.
Note that there is no need to press this button if the tuner's power is ON. (If it is pressed, the tuner will be switched to standby mode.)

While listening to music

Press this button to temporarily reduce the volume level. The volume level is attenuated by 20 dB. (approx. 1/10) Press once again to return to the previous volume level.

Adjust the volume level.



Listening to phono discs

◀START — Press to start the play.

TURNTABLE ■STOP — Press to stop the play.

Listening to compact discs

▶PLAY/ ❚❚PAUSE — Press to start the play.

▶PLAY/ ❚❚PAUSE — Press to temporarily stop the play. Press to resume the play.

CD ■STOP — Press to stop the play.

To search for a certain track (skip play)

⏮ — Press momentarily to search for the track now playing. Repeat this step the necessary number of times to search for a previous track.

⏭ — Press momentarily to search for the next track.

To search for a desired position (search play)

⏮ — To move backward quickly on the disc, press and hold, and then release at the desired position.

⏭ — To move forward quickly on the disc, press and hold, and then release at the desired position.

Listening to radio broadcasts

1 – 0 — Press to listen to the desired preset "channel".

To listen to sound corrected by an equalizer

ON/FLAT — Press to switch the equalizer correction ON. Press once again to switch it OFF.

PRESET — Press to retrive the memorized curve. (For Technics graphic equalizer with the preset memory function only.)

Recording ("DECK A" only)

1 DECK A/B — Press to select the "DECK A".

2 ●REC PAUSE — Press. (Recording stand-by mode)

3 Begin the sound source.

4 ◀PLAY ▶PLAY — Press to select the tape side for recording. (Recording will begin.)

TAPE ■STOP — Press to stop the recording.

●REC PAUSE — Press to temporarily stop recording. To begin recording once again, press the playback button.

Listening to tapes

1 DECK A/B — Press to select the deck ("DECK A" or "DECK B") operated.

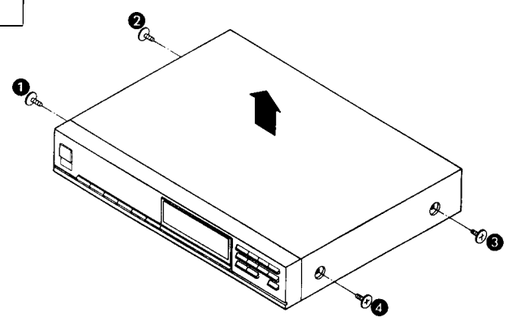
2 ◀PLAY ▶PLAY — ▶:For foward side ◀:For reverse side. Press to select the tape side for playing back. (Playback will start.)

TAPE ■STOP — Press to stop the playback.

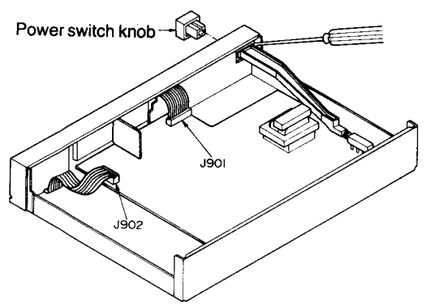
⏪ ⏩ — Press to advance or rewind the tape.

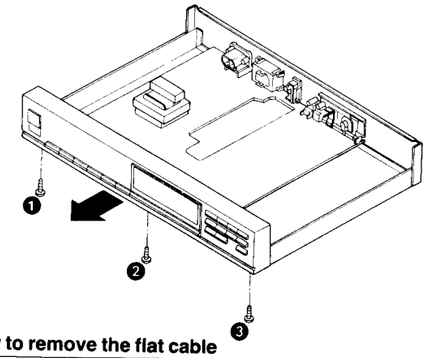
■ DISASSEMBLY INSTRUCTIONS

Ref. No. 1	How to remove the cabinet
Procedure 1	•Remove the 4 screws (❶~❹).



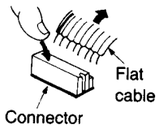
Ref. No. 2	How to remove the front panel
Procedure 1→2	1. Remove the power switch knob by pushing it from behind the front panel. 2. Remove the flat cable (J901, J902). 3. Remove the 3 screws (❶~❸). 4. Remove the front panel in the direction of the arrow.



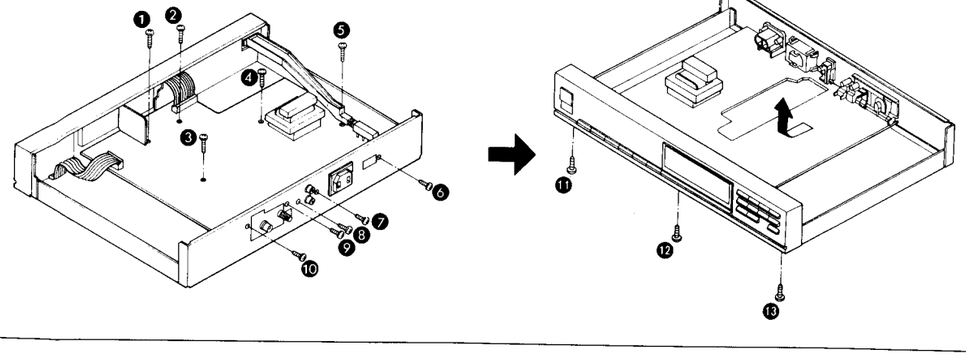


How to remove the flat cable

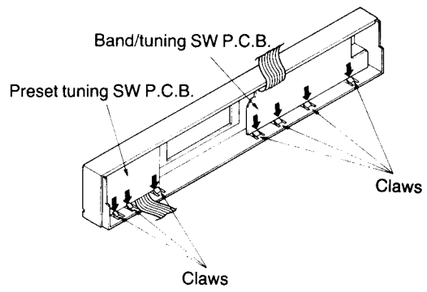
Pull out the flat cable while pressing the connector.



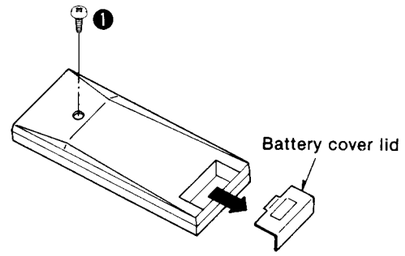
Ref. No. 3	How to remove the main P.C.B.
Procedure 1→3	1. Remove the 10 screws (❶~❿). 2. Remove the 3 screws (⓫~⓭). 3. Slightly pull the front panel toward you and remove the main P.C.B.

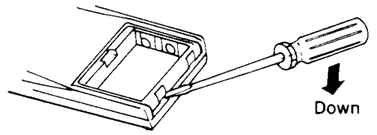


Ref. No. 4	How to remove the preset tuning SW P.C.B. and band/tuning SW P.C.B.
Procedure 1→2→4	1. Push the 3 claws and remove the preset tuning SW P.C.B. 2. Push the 4 claws and band/tuning SW P.C.B.



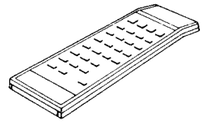
Ref. No. 5	How to remove the remote control
Procedure 5	1. Remove the battery cover lid. 2. Remove the one screw (❶). 3. Insert a screwdriver blade between the upper and lower covers inside the battery compartment and then slowly loosen the bottom cover.



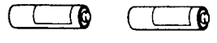


■ ACCESSORIES

- Remote-control transmitter 1 (EUR64753)

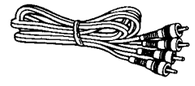


- Batteries 2 (UM-4NE)

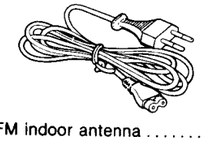


- 3-core flat cable 1 (SWKTX930E)

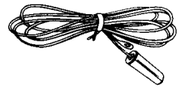
- Stereo connection cable 1 (SJPK2203-1)



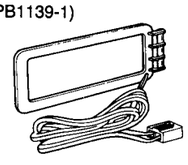
- AC power supply cord 1 (SFDAC05E03)



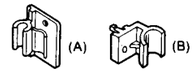
- FM indoor antenna 1 (SSA270)



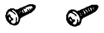
- AM loop antenna 1 (SPB1139-1)



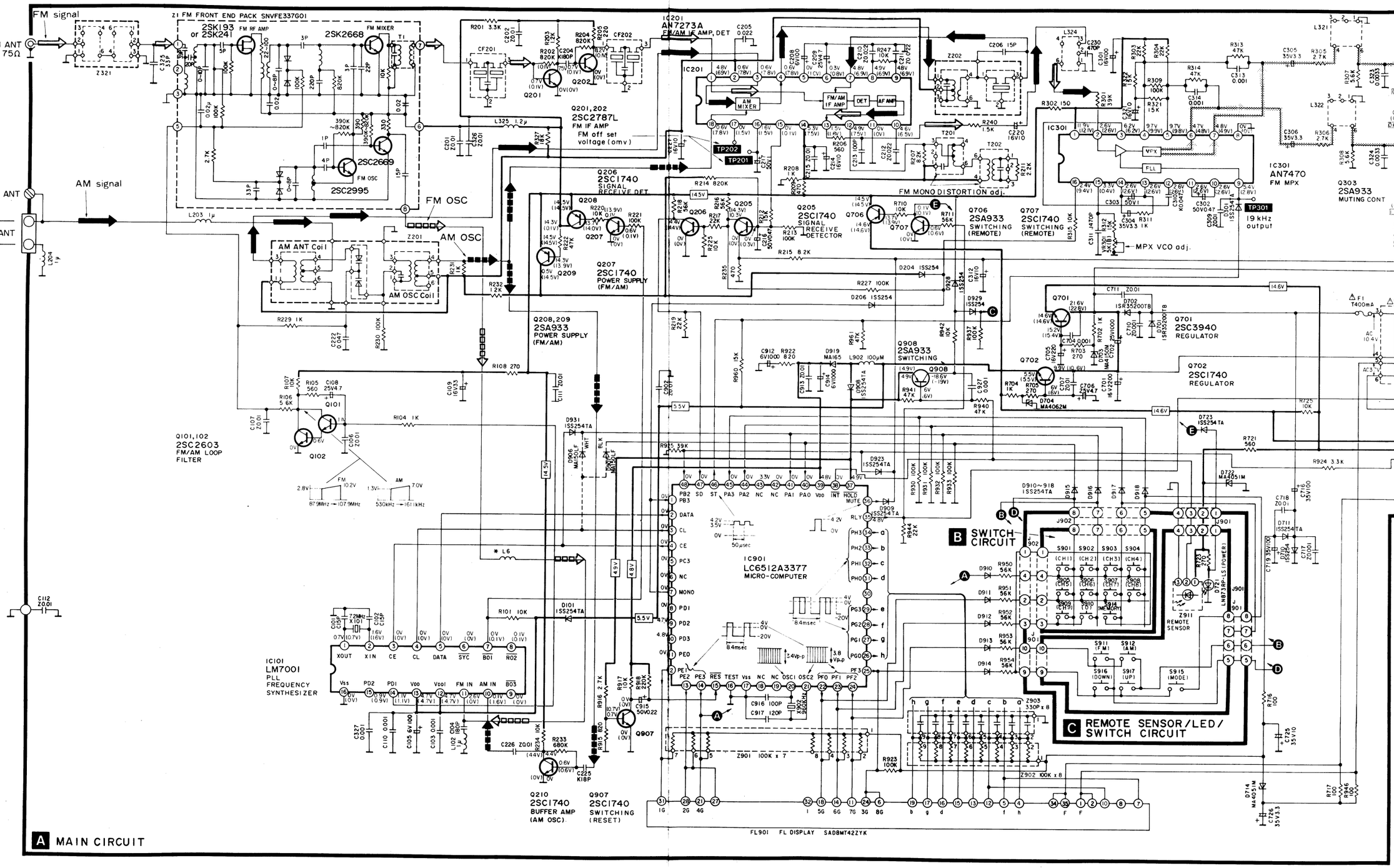
- AM antenna holders 2 (SMA231M) (SMA233-1M)

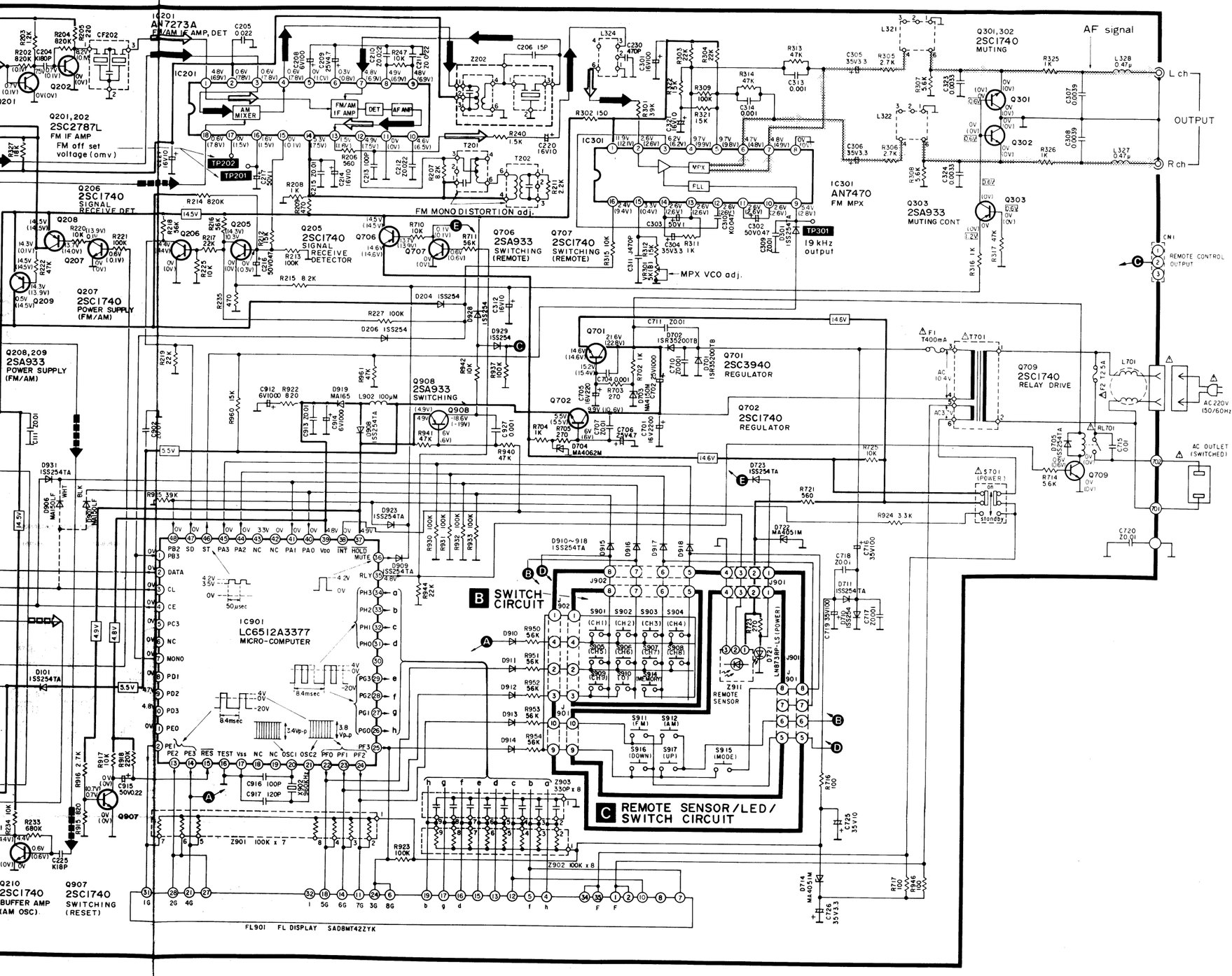


- Screws ..... 2 (XTN3+10AFZ)



Note: Configuration of AC power supply cord and FM indoor antenna differs according to area.


FM signal
FM ANT 75Ω
AM ANT
AM signal
AM LOOP ANT
Z1 FM FRONT END PACK SNVFE337G01
2SK193 or 2SK241
FM RF AMP
2SK2668
FM MIXER
2SC2669
FM OSC
2SC2995
AM ANT Coil
AM OSC Coil
AM OSC
FM OSC
Z201
Q101,102
2SC2603
FM/AM LOOP FILTER
Q201,202
2SC2787L
FM IF AMP
FM off set voltage (omv)
IC201
AN7273A
FM/AM IF AMP, DET
Q206
2SC1740
SIGNAL RECEIVE DET
Q205
2SC1740
SIGNAL RECEIVE DETECTOR
Q207
2SC1740
POWER SUPPLY (FM/AM)
Q208,209
2SA933
POWER SUPPLY (FM/AM)
FM MONO DISTORTION adj.
Q706
2SA933
SWITCHING (REMOTE)
Q707
2SC1740
SWITCHING (REMOTE)
TP301
19 kHz output
IC301
AN7470
FM MPX
MPX VCO adj.
Q303
2SA933
MUTING CONT
Q301,302
2SC1740
MUTING
Q908
2SA933
SWITCHING
Q701
2SC3940
REGULATOR
Q702
2SC1740
REGULATOR
Q709
2SC1740
RELAY DRIVE
IC101
LM7001
PLL FREQUENCY SYNTHESIZER
IC901
LC6512A3377
MICRO-COMPUTER
Q210
2SC1740
BUFFER AMP (AM OSC)
Q907
2SC1740
SWITCHING (RESET)
FL901 FL DISPLAY SAD8MT42ZYK
B SWITCH CIRCUIT
C REMOTE SENSOR/LED/ SWITCH CIRCUIT
A MAIN CIRCUIT



■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

Note 1:

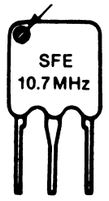
- **S701** : Power source switch in "**on**" position.
- **S901～S910** : Preset tuning switch.
  (**S901: CH1, S902: CH2, S903: CH3, S904: CH4, S905: CH5, S906: CH6, S907: CH7, S908: CH8, S909: CH9, S910: CH0**)
- **S911** : FM select switch.
- **S912** : MW select switch.
- **S914** : Memory set switch. **(manual←→auto memory)**
- **S915** : FM mode switch.
- **S916** : Tuning **(down)** switch.
  [down: tuning to lower frequency]
- **S917** : Tuning **(up)** switch.
  [up: tuning to higher frequency]
- Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
  *Figures in ( ) stand for DC voltage in MW signal reception mode.
  *Figures in [ ] stand for DC voltage in LW signal reception mode.
- ——— Positive voltage lines
  □□□□▷ FM OSC
  ■■■■▶ AM OSC
  ····· AF signal lines
  ⇨ FM signal
  ➡ AM signal
- Important safety notice
  Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

Note 2:

• Use of ceramic filters in pairs

The ceramic filters (CF201, CF202) for FM-IF circuit are available in three ranks. For this circuit, be sure to use the ceramics of the same rank in a pair.
At repairing and replacement, pay close attention to the diodes (D906, D907) for use as different diodes must be used depending on each rank of the ceramic filters.

Color marking
(Red, Black or White)



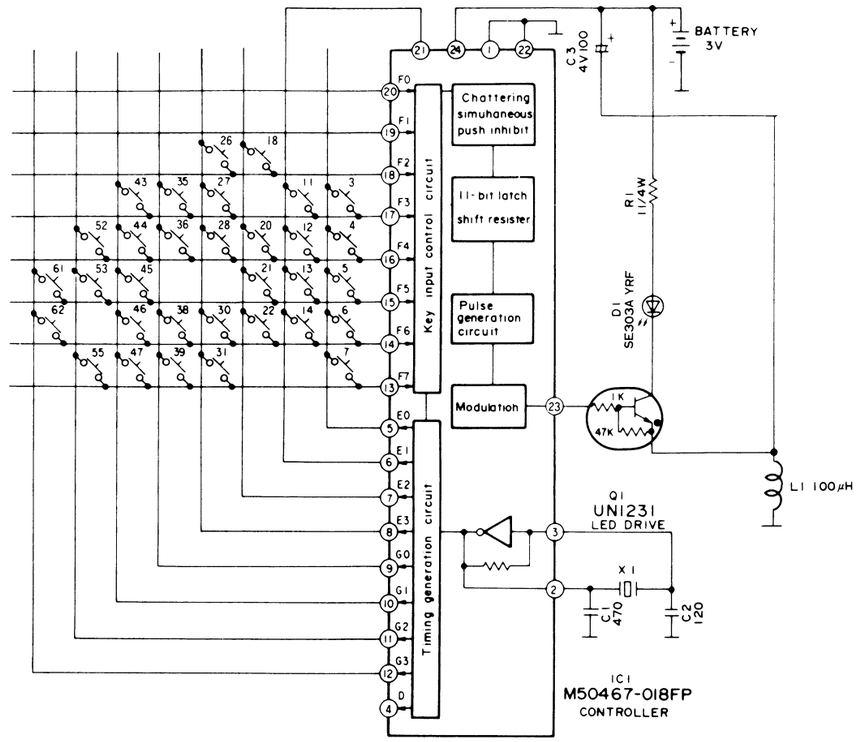
RANK (Color)	D906	D907	CENTER FREQUENCY
White	○	×	10.65MHz
Red	×	×	10.70MHz
Black	×	○	10.76MHz

Note: ○ mark: Diode is used.
× mark: Diode is not used.

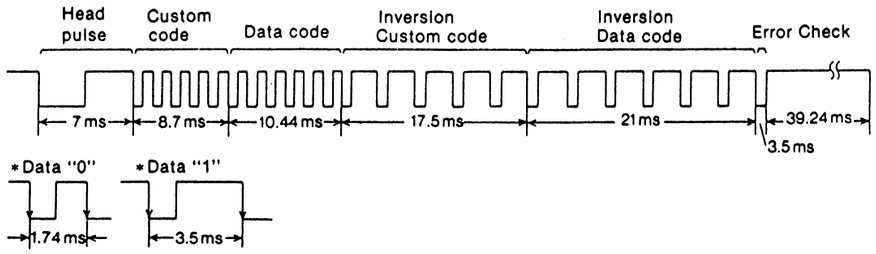
✱ Caution!

IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.
✱ Cover the parts boxes made of plastics with aluminum coil.
✱ Ground the soldering iron.
✱ Put a conductive mat on the work table.
✱ Do not touch the legs of IC or LSI with the fingers directly.

• Remote control unit

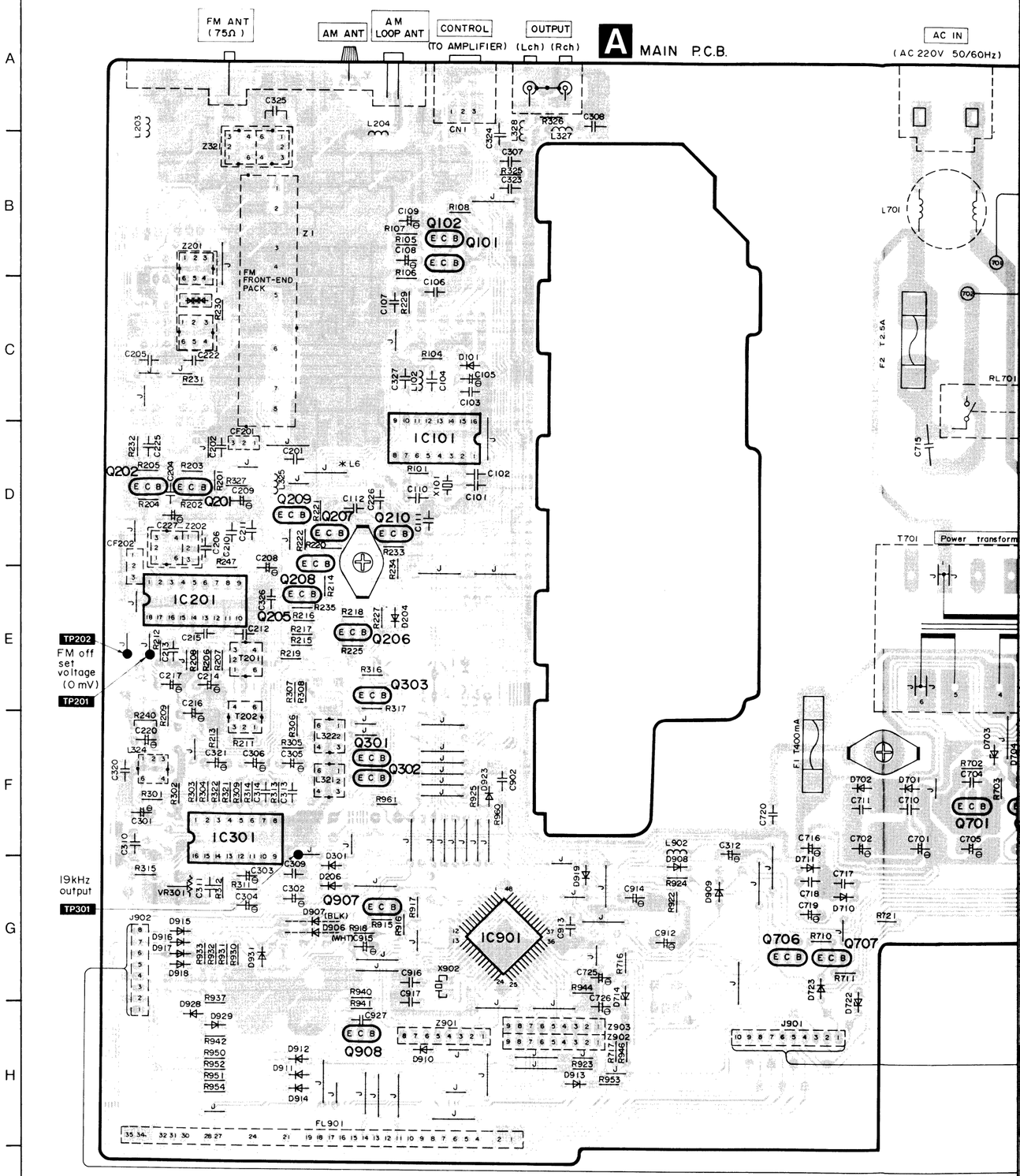


• Remote control data code

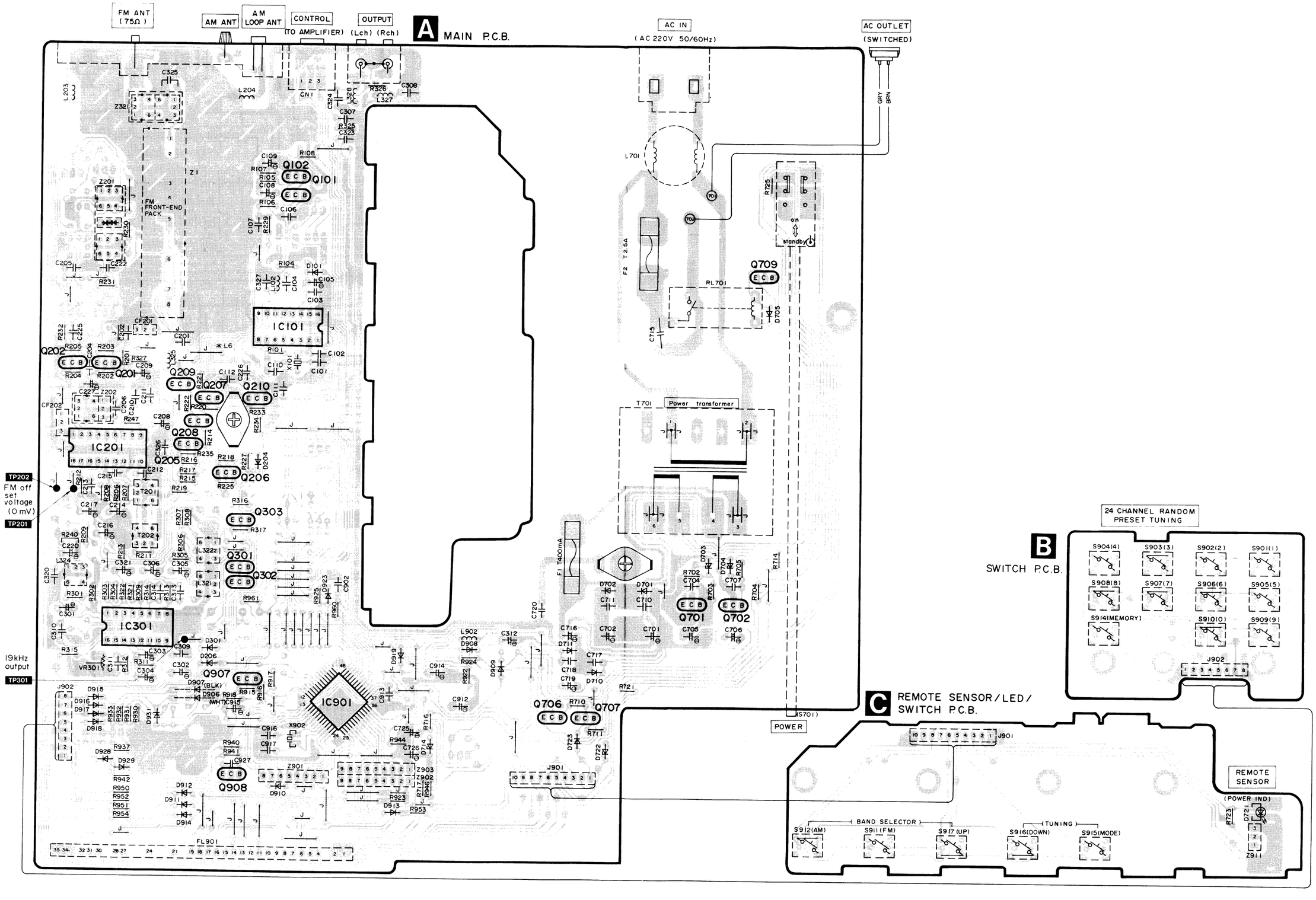


Key No.	Function	Custom code	Data code	Key No.	Function	Custom code	Data code
3	Auto rec mute	01001	000111	30	Tuner 8	01001	010111
4	Deck play ◀	01001	001001	31	Tuner 1	01001	010000
5	Vol. up	01001	100100	35	CD • skip/search	01100	000010
6	Tuner 5	01001	010100	36	Pause	01001	000110
7	Power ON/OFF	01001	100000	38	Tuner 9	01001	011000
11	CD play/pause	01100	001010	39	Tuner 2	01001	010001
12	Deck play ▶	01001	001010	43	CD • skip/search	01100	000011
13	Vol. Down	01001	100101	44	Deck stop	01001	000000
14	Tuner 6	01001	010101	45	※1	01001	110011
18	Turntable start	01001	001100	46	Tuner 0	01001	011001
20	Deck ◀◀	01001	000010	47	Tuner 3	01001	010010
21	Muting	01001	100111	52	Rec Pause	01001	001000
22	Tuner 7	01001	010110	53	Deck A/B	01001	000100
26	Turntable stop	01001	001101	55	Tuner 4	01001	010011
27	CD stop	01100	000000	61	EQ • OF/FLAT	01001	110000
28	Deck ▶▶	01001	000011	62	EQ Preset	01001	110010

■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

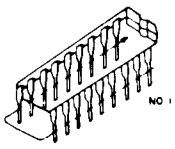


■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

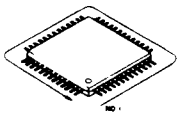


Data code
010111
010000
000010
000110
011000
010001
000011
000000
110011
011001
010010
001000
000100
010011
110000
110010

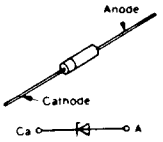
■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES



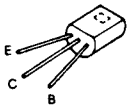
SVIUPC1161C3	16 Pin
LM7001	16 Pin
AN7273B	18 Pin



LC6512A3377	48 pin

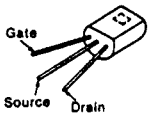


MA4051M
MA4062M
MA4150M

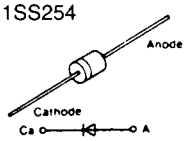


2SC2787L
2SC2786M
2SC1740SQ
2SC1685-QNC
2SA933SQR

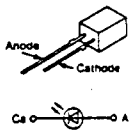
2SK544F-AC



MA165
MA162A
1SS254

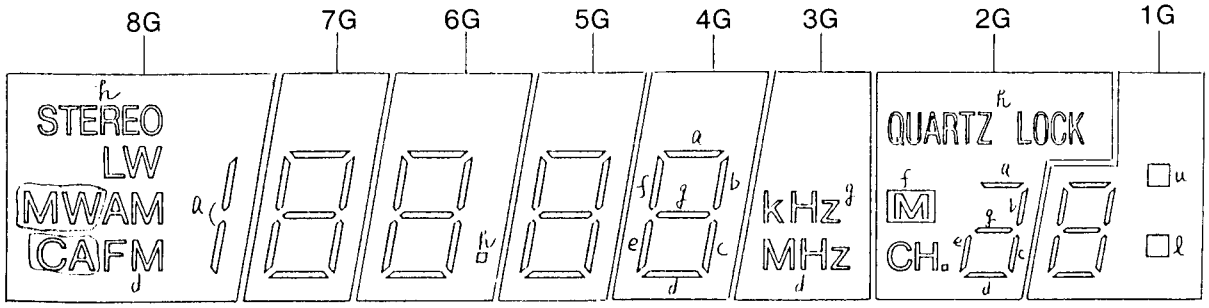


LN273RP



■ DESCRIPTION OF FL PANEL

•GRID ASSIGNMENT

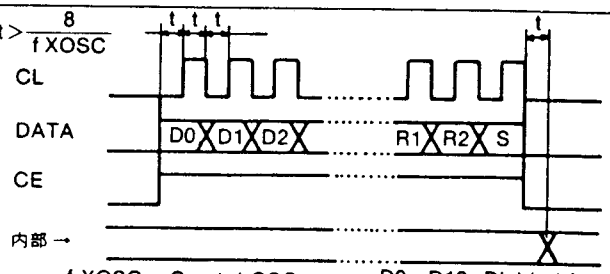


Note: The grid of 3G and 8G are used for external connection.

•PIN CONNECTION

PIN NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
CONNECTION	F1	F1	NP	h	f	8G	AM	MW	CA	LW	7G	c	a	6G	e	d	g	5G	b	NP	4G	NP	NP	3G	NP	NP	CH	2G	NP	u	1G	ℓ	NP	F2	F2

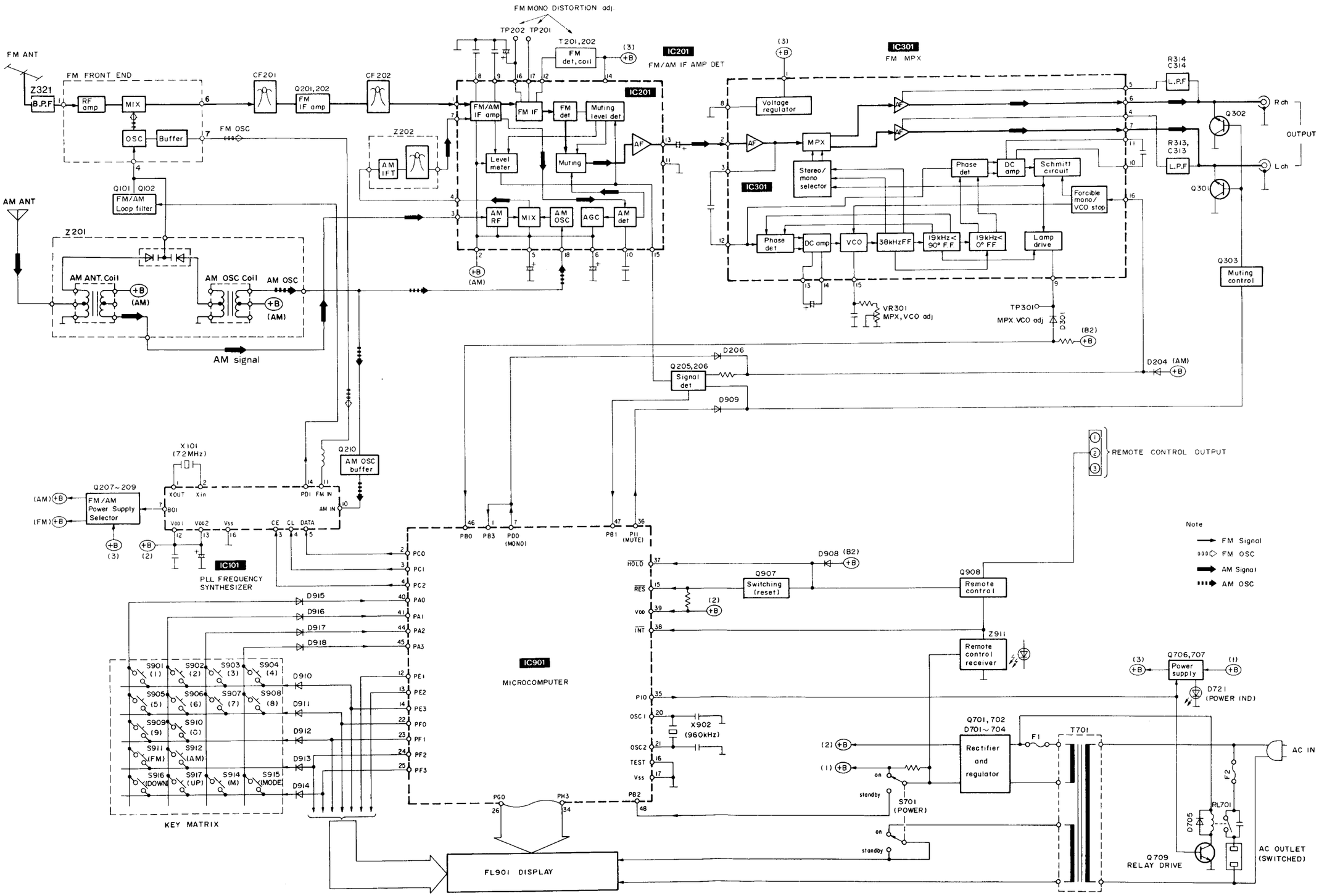
■ FUNCTIONS OF IC TERMINALS (IC901: LC6512A3377)

PIN NO.	IN/OUT	MARK	DESCRIPTION OF TERMINAL
1	INPUT	PB3	Computer drive terminal.
2	OUTPUT	DATA	Data output $t > \frac{8}{f\,XOSC}$  f XOSC: Crystal OSC D0~D13: Divided frequency data R0~R2: Reference frequency data
3		CL	
4		CE	
5	—	PC3	Not used in this unit.
6	—	NC	Not used in this unit.
7	OUTPUT	PD0	Auto/mono changeover terminal. (auto → 0V, mono → 5V)
8	OUTPUT	PD1	Computer drive terminal.
9	—	PD2	Not used in this unit.
10		PD3	
11		PE0	
12 ~ 14 • 22 ~ 25	OUTPUT	PE1 ~ PE3 • PF0 ~ PF3	Digital signal terminal for display. Terminal for key return signal to external key matrix.
15	INPUT	$\overline{RES}$	Reset terminal.
16	—	TEST	Ground terminal.
17		V_{SS}	
18	—	NC	Not used in this unit.
19			
20	INPUT	OSC1	Connecting terminal for crystal oscillator.
21	OUTPUT	OSC2	
26 ~ 29 • 31 ~ 34	OUTPUT	PG0 ~ PG3 • PH0 ~ PH3	Segment signal terminal for display.
30	—	NC	Not used in this unit.
35	OUTPUT	P10	Control signal terminal for relay (RLY701).
36	OUTPUT	P11	Muting signal terminal. (Muting → High level)
37	INPUT	$\overline{HOLD}$	Terminal for power failure detection.
38	INPUT	$\overline{INT}$	Terminal for remote control cord.
39	INPUT	V_{DD}	Power supply terminal of device. Voltage of 5V is supplied during operation of device.
40	INPUT	PA0 ~ PA3	Terminal for key return signal to external key matrix. [KEY MATRIX]
41			
44			
45			
42 • 43	—	NC	Not used in this unit.
46	INPUT	PB0 ~ PB2	Stereo signal terminal.
47			SD signal terminal.
48			Tuner select terminal. (Ground connection)

[KEY MATRIX]

Pin No.	45	44	41	40
14	CH4	CH3	CH2	CH1
22	CH8	CH7	CH6	CH5
23	—	—	CH0	CH9
24	—	—	AM	FM
25	MODE	MEMORY	UP	DOWN

■ BLOCK DIAGRAM



■ MEASUREMENTS AND ADJUSTMENTS

FM ADJUSTMENT

Control positions and equipment used

- FM signal generator(FM-SG)
- Stereo modulator
- Distortion analyser
- DC electronic voltmeter(EVM)
- Frequency counter
- Choke coil(100μH)
- Resistor(100kΩ)

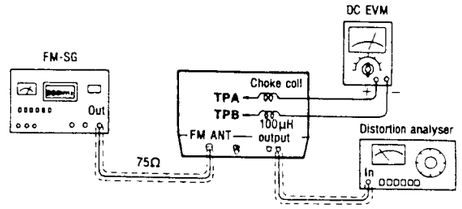
Note: For Z202(AM-IFT) and Z251(AM ANT and OSC coil),they are supplied as adjusted parts. So, do not turn the cores of the parts.

FM MONO DISTORTION ADJUSTMENT

1.Test equipment connection is shown in figure.
2.Set the unit to **"FM"** mode.
3.Set the radio frequency display and signal generator to **100.10MHz**.
4.Adjust the core of **T201** so that the voltage measured in signal mode is **0mV(0±20mV)** in 300mV range.
5.Adjust **T202** so that the distortion factor of L-CH is minimized.
6.Repeat steps 4 and 5.
7.Make sure that the distortion factors of L-CH and R-CH are nearly the same and minimum.

Note: The adjusting screwdriver used should be made of resin.

FM SIGNAL GENERATOR CONDITION
Modulation 100%
Modulation frequency 1kHz
Output level.....66dB



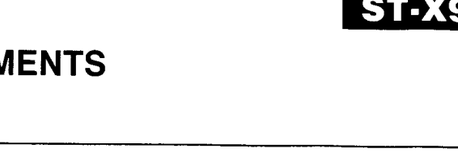
TPA = TP201 , TPB = TP202

MPX VCO ADJUSTMENT

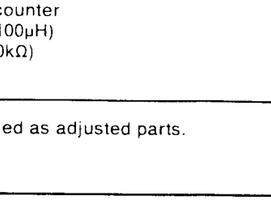
1.Test equipment connection is shown in figure.
2.Set the unit to **"on/auto"** position.
3.Set the radio frequency display and signal genarator to **100.10MHz**.
4.Adjust **VR301** for **19kHz±30Hz** on frequency counter reading.

USING ALTERNATE SYSTEM
1.Receive the stereo broadcast.
2.Adjust **VR301** until stereo indicator lights up. Fix the arm of **VR301** as shown in figure.

FM SIGNAL GENERATOR CONDITION
Modulation 100%
Modulation frequency 0kHz
Output level.....66dB



TPA = TP301



TPA

Ⓐ−Ⓑ,
Ⓓ−Ⓔ..... **"Stereo" OFF position**
Ⓑ−Ⓓ..... **"Stereo" ON position (Indicator lighting)**
Ⓒ..... **Adjust point of pilot circuit**

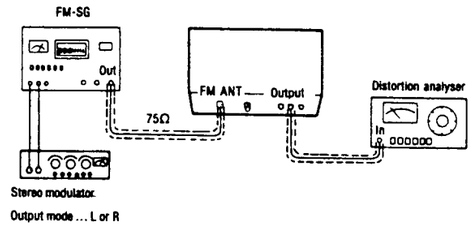
TPA = VR301

FM STEREO DISTORTION ADJUSTMENT

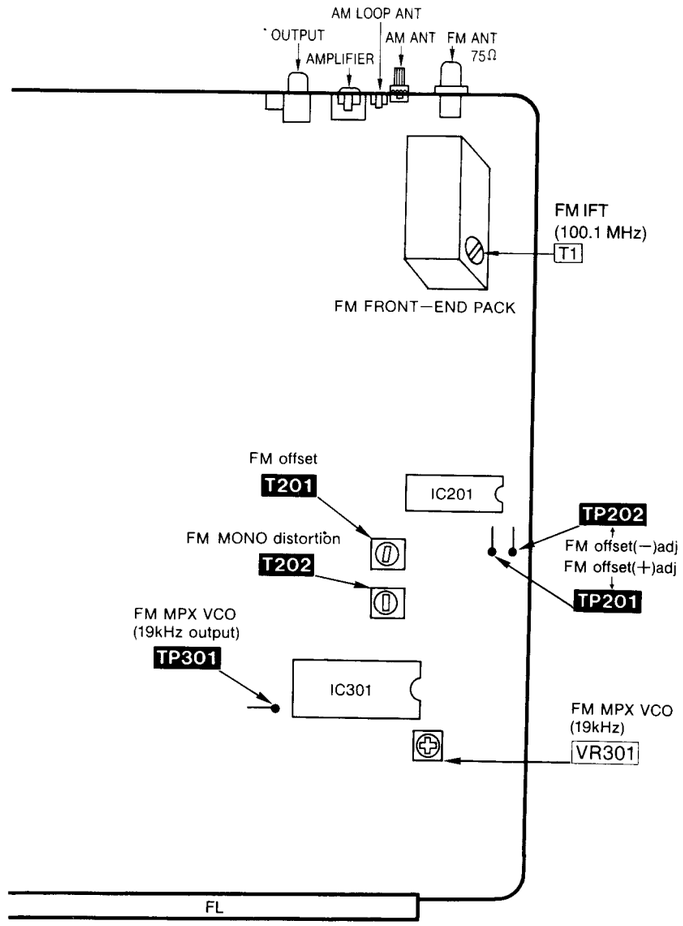
1.Test equipment connection is shown in figure.
2.Set the unit to **"FM"** mode.
3.Set the radio frequency display and signal generator to **100.10MHz**.
4.Adjust **T1** so that the distortion factor of L-CH is minimized.
5.Make sure that the distortion factors of L-CH and R-CH are nearly the same and minimum.

Note: The adjusting screwdriver used should be made of resin.

FM SIGNAL GENERATOR CONDITION
Modulation .....**"L"mode or "R"mode 90%, Pilot 10%**
Modulation frequency .....1kHz(Pilot 19kHz)
Output level.....66dB



●ADJUSTMENT POINTS



■ REPLACEMENT PARTS LIST

Notes : * Important safety notice :
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* Bracketed indications in Ref. No. columns specify the area. (Refer to the first page for area.)
Parts without these indications can be used for all areas.
* Remote Control Ass'y:
Supply period for three years from termination of production.
* [F]: Indicates parts that are supplied by PFS. (Panasonic France S.A.Longwy division)

•ELECTRICAL PART LIST

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC101	LM7001	I.C. PLL SYNTHE
IC201	AN7273B	I.C. FM/AM IF AMP. DET
IC301	SVIUPC1161C3	I.C. FM MPX
IC901	LC6512A3377	I.C. MICRO COM.
TRANSISTORS		
Q101	2SC2603EFG	TRANSISTOR
Q102	2SC2603EFG	TRANSISTOR
Q201	2SC2787L	TRANSISTOR
Q202	2SC2787L	TRANSISTOR
Q205	2SC1740SQ	TRANSISTOR
Q206	2SC1740SQ	TRANSISTOR
Q207	2SC1740SQ	TRANSISTOR
Q208	2SA933SQR	TRANSISTOR
Q209	2SA933SQR	TRANSISTOR
Q210	2SC1740SQ	TRANSISTOR
Q301	2SC1740SQ	TRANSISTOR
Q302	2SC1740SQ	TRANSISTOR
Q303	2SA933SQR	TRANSISTOR
Q701	2SC3940AQSTA	TRANSISTOR
Q702	2SC1740SQ	TRANSISTOR
Q706	2SA933SQR	TRANSISTOR
Q707	2SC1740SQ	TRANSISTOR
Q907	2SC1740SQ	TRANSISTOR
Q908	2SA933SQR	TRANSISTOR
Q982	2SA933SQR	TRANSISTOR
DIODES		
D101	MA165	DIODE
D204	MA165	DIODE
D206	MA165	DIODE
D301	MA165	DIODE
D701	SVD1SR35200A	DIODE
D702	SVD1SR35200A	DIODE
D703	MA4150M	DIODE
D704	MA4062-M	DIODE
D705	MA165	DIODE
D710	MA165	DIODE
D711	MA165	DIODE
D714	MA4051-M	DIODE
D721	LN873RP-LS	DIODE
D722	MA4051-M	DIODE
D723	MA165	DIODE
D906	MA162A	DIODE
D907	MA162A	DIODE
D908	MA165	DIODE
D909	MA165	DIODE
D910	MA165	DIODE
D911	MA165	DIODE
D912	MA165	DIODE
D913	MA165	DIODE
D914	MA165	DIODE
D915	MA165	DIODE
D916	MA165	DIODE
D917	MA165	DIODE
D918	MA165	DIODE
D919	MA165	DIODE
D923	MA165	DIODE
D928	MA165	DIODE
D929	MA165	DIODE
D931	MA165	DIODE
D989	MA165	DIODE

Ref. No.	Part No.	Description
VARIABLE RESISTORS		
VR301	EVND4AA00B53	V.R. MPX VCO ADJ.
COILS AND TRANSFORMERS		
L102	RLQZP1R2KT-Y	CHOKE COIL
L203	ELEPK1R0MA	COIL
L204	ELEPK1R0MA	COIL
L321	SLM1B9-P	MPX COIL
L322	SLM1B9-P	MPX COIL
L324	SLM1B10-M	COIL
L325	RLQZP1R2KT-Y	CHOKE COIL
L327	ELEPKR47MA	COIL
L328	ELEPKR47MA	COIL
L701 ⚠	SLQZ650MH49	CHOKE COIL
L902	RLQZP101KT-Y	COIL
T201	SLI4B511-Z	I.F.TRANSFORMER
T202	SLI4B513-Z	I.F.TRANSFORMER
T701 ⚠	SLT5K259-K	POWER TRANSFORMER
COMPONENT COMBINATIONS		
Z1	SNVFE337G01	TUNER PACK
Z201	SLA2Z1-T	COIL
Z202	SLI7Z101-T	I.F.TRANSFORMER
Z321	SLA4Z13-Z	ANTENNA COIL
Z901	EXBF8E104J	COMBINATION
Z902	EXBF9E104J	COMBINATION
Z903	EXFP8331MW	COMBINATION
Z911	GP1U509M	DIODE, REMOTE SENSOR
FILTERS		
CF201	SVFE107MZ-A	CERAMIC FILTER
CF201	SVFE107MZ-D	CERAMIC FILTER
CF201	SVFE107MZ-E	CERAMIC FILTER
CF202	SVFE107MM-A	CERAMIC FILTER
CF202	SVFE107MM-D	CERAMIC FILTER
CF202	SVFE107MM-E	CERAMIC FILTER
X101	SVQ49U722-D	CRYSTAL OSCILLATOR
X902	EF0A960K04A	CRYSTAL OSCILLATOR
DISPLAYS		
FL901	SAD8MT42ZYK	DISPLAY TUBE
FUSES		
F1 ⚠	XBA2C04TB0	FUSE, T0.4A250V
F2 ⚠	XBA2C25TB0	FUSE, T2.5A 250V
SWITCHES		
S701 ⚠	SSH1196-1	SW, POWER
S901	EVQQB005R	SW, CH1
S902	EVQQB005R	SW, CH2
S903	EVQQTG05R	SW, CH3
S904	EVQQB005R	SW, CH4
S905	EVQQB005R	SW, CH5
S906	EVQQB005R	SW, CH6
S907	EVQQB005R	SW, CH7
S908	EVQQB005R	SW, CH8
S909	EVQQB005R	SW, CH9
S910	EVQQB005R	SW, 0
S911	EVQQB005R	SW, FM
S912	EVQQB005R	SW, AM
S914	EVQQB005R	SW, MEMORY
S915	EVQQB005R	SW, MODE
S916	EVQQB005R	SW, DOWN
S917	EVQQB005R	SW, UP
RELAYS		
RL701 ⚠	SSY138	RELAY

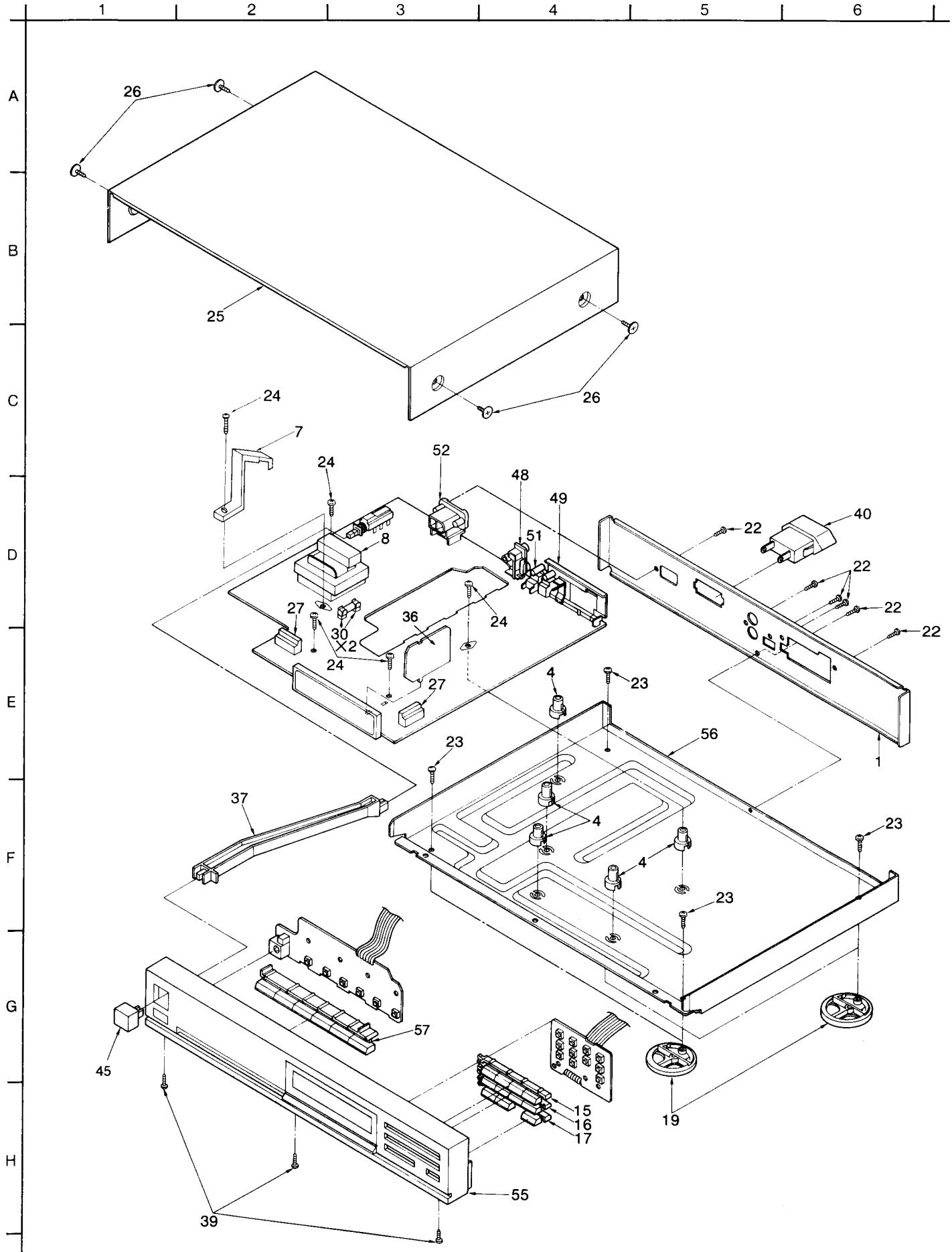
•CABINET PARTS LIST

Ref. No.		Part No.	Description
CABINET AND CHASSIS			
1 (EI)		SGPTX930-KE1	REAR PANEL
1 (EI)		SGPTX930-KE2	REAR PANEL [F]
1 (EG)		SGP7350D	PANEL
4		SHE181	HOLDER
7		SUS772	GROUND BRACKET
8		SHG6385-2	RUBBER SPACER
15		SBC989D	BUTTON, PRESET
16		SBC989E	BUTTON, PRESET
17		SBZ9104	BUTTON, PRESET/MEMORY
19		SKL307	FOOT
22		XTBS3+8JFZ1	SCREW
23		XTB3+8G	SCREW
24		XTB3+20J	SCREW
25		SKC2060K16	CABINET
26		SNE2129-1	SCREW
27		SJT30843-V	CONNECTOR(8P)
27		SJT31043-V	CONNECTOR(10P)
30	⚠	SJT347	FUSE HOLDER
36		SHR9862	HOLDER
37		SUB267	ROD
39		XTB3+8JFZ	SCREW
40	⚠	SJS9225	AC OUTLET
45		SBC666-1	BUTTON, POWER
48		SJF3250	TERMINAL BOARD
49		SJF8305N	TERMINAL PLATE
51		SJS306	REMOTE CONTROL JACK
52	⚠	SJS9236	AC INLET
55		SGYTX930-KG	PANEL
56		SKU11651-1	BOTTOM BOARD
57		SBZ9107	BUTTON, TUNING/SELECT

•PACKING PARTS LIST

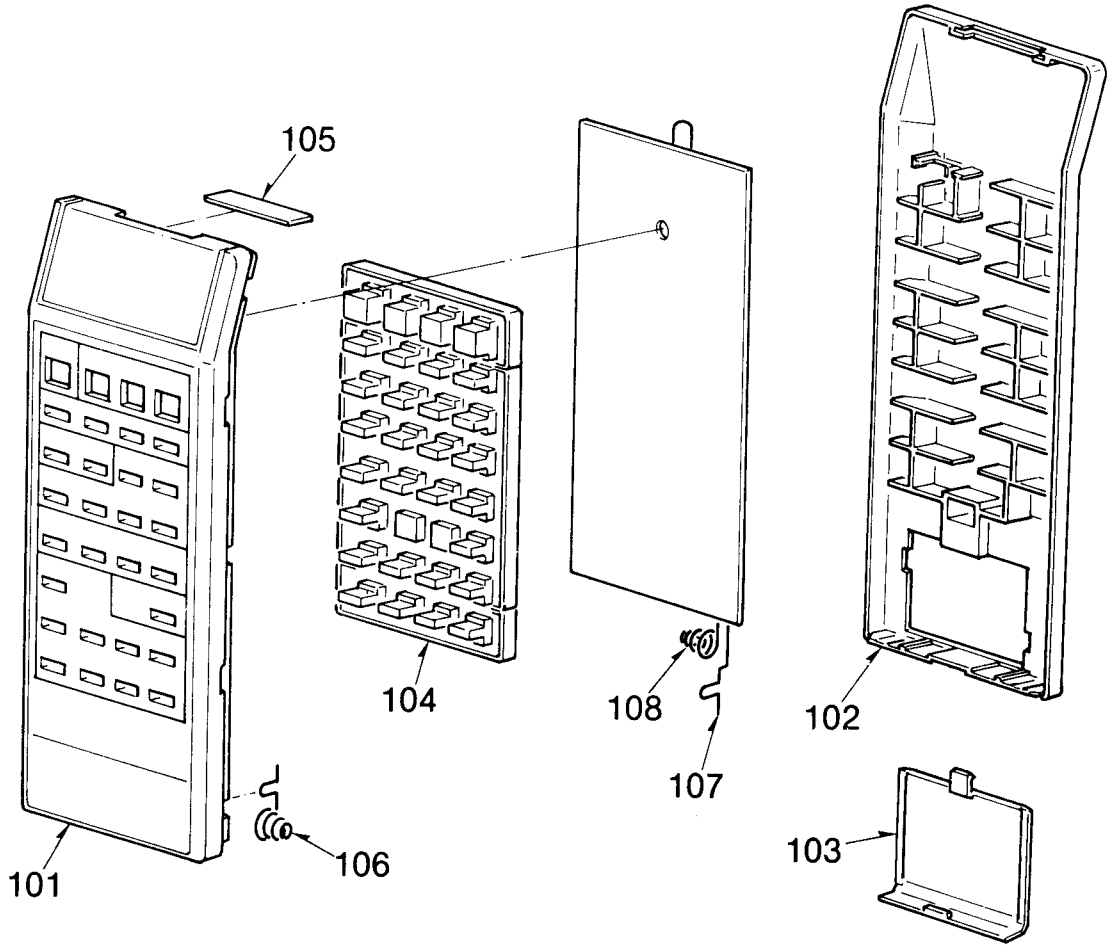
Ref. No.		Part No.	Description
PACKING MATERIAL			
P1 (EI)		SPG6193	PACKING CASE
P1 (EI)		SPG6314	PACKING CASE [F]
P1 (EG)		SPG6315	PACKING CASE
P2		SPS5169	PAD
P3		SPS5170	PAD
P4		SPP740	PROTECTION COVER
ACCESSORIES			
A1	⚠	SFDAC05E03	POWER CORD
A2		SSA270	ANTENNA
A3 (EI)		SQF13178	INSTRUCTIONBOOK
A3 (EG)		SQF13278	INSTRUCTION BOOK
A3 (EI)		SQF13279	INSTRUCTION BOOK [F]
A4		SJPK2203-1	CORD
A5		SMA231M	BRACKET
A6		SMA233-1M	HOLDER
A7		SPB1139-1	AM LOOP ANTENNA
A8		XTN3+10AFZ	SCREW
A9		UM-4NE	BATTERY
A10		SWKTX930E	LEAD WIRE
A11		EUR64753	REMOTE CONTROLLER

■ EXPLODED VIEW



■ EXPLODED VIEW

•REMOTE CONTROL UNIT PARTS



•REMOTE CONTROL UNIT PARTS LIST

Ref. No.	Part No.	Description
REMOTE CONTROLL		
INTEGRATED CIRCUITS		
IC1	M50467018FP	INTEGRATED CIRCUIT
TRANSISTORS		
Q1	UN1231	TRANSISTOR
DIODES		
D1	LN66-S	L.E.D
COIL		
L1	ELEA101JA	COIL
OSCILLATOR		
X1	CSB420PB1	OSCILLATOR

Ref. No.	Part No.	Description
RESISTORS		
R1	ERDS2TJ1R0	CARBON, 1Ω, 1/4W
CAPACITORS		
C1	ECKD1H471KB	CERAMIC, 470PF, 50V
C2	ECKD1H121KB	CERAMIC, 120PF, 50V
C3	ECEA0GK101	ELECTROLYTIC, 100μF, 4V
MECHANISM PARTS		
101	UR64VCS564	UPPER CABINET
102	UR64CS803A	LOWER CABINET
103	UR64EC804	BATTERY COVER
104	UR64CT805C	RUBBER SWITCH
105	UR52SB327	PLATE
106	UR64TD374	BATTERY TERMINAL(COMMON)
107	UR64TD808	TERMINAL
108	UR64TD809	TERMINAL

■ RESISTORS AND CAPACITORS

Notes : * Important safety notice :
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* Bracketed indications in Ref. No. columns specify the area. (Refer to the first page for area.)
Parts without these indications can be used for all areas.

Numbering System of Resistor

Example:

ERD	25	F	J	102
Type	Wattage (1/4W)	Shape	Tolerance	Value (1KΩ)
ERX	2	AN	J	471
Type	Wattage (2W)	Shape	Tolerance	Value (470Ω)

Numbering System of Capacitor

Example:

ECKD	1H	102	Z	F
Type	Voltage (50V)	Value (0.001μF)	Tolerance	Peculiarity
ECEA	50	M	330	
Type	Voltage (50V)	Pecliarity	Value (33μF)	

● Capacity values are in microfarads (μF) unless specified otherwise, P = Pico-farads (pF) F = Farads (F).
● Resistance values are in ohms (Ω), unless specified otherwise, 1K = 1,000Ω, 1M = 1,000kΩ

Resistor Type	Wattage		Tolerance
ERD : Carbon	10 : 1/8W	12 : 1/2W	J : ±5%
ERG : Metal Oxide	14 : 1/4W	25 : 1/4W	F : ±1%
ERQ : Fuse Type Metal	1A : 1W	18 : 1/8W	G : ±2%
ERX : Metal Film	S2 : 1/4W	S1 : 1/2W	J : ±5%
ERD L : Carbon (chip)	2F : 1/4W	50 : 1/2W	K : ±10%
ERO K : Metal Film (chip)	2A : 2W	3A : 3W	M : ±20%
ERC : Solid	6G : 1/10W	8G : 1/8W	
ERF : Incombustible Box-Shaped			
ERM : Wire-Wound			
RRJ : Cip Resistor			
ERJ : Cip Resistor			

Capacitor Type	Voltage		Tolerance
ECE : Electrolytic	0J : 6.3V	1A : 10V	K : ±10%
ECCD : Ceramic	1C : 16V	1E : 25V	M : ±20%
ECKD : Ceramic Capacitor	1H : 50V	1V : 35V	Z : +80 −20 %
ECQM : Poyester	50 : 50V	05 : 50V	
ECQP : Polypropylene	2H : 500V	2A : 100V	J : ±5%
ECG : Ceramic	1 : 100V	1J : 63V	G : ±2%
ECEA N : Non Polar Electrolytic	KC : 400V AC		F : ±1%
QCU : Ceramic (Chip Type)	KC : 125V AC		C : ±0.25pF
ECUX : Ceramic (Chip Type)	(UL)		D : ±0.5pF
ECF : Semiconductor			
EECW : Liquid electrolyte double layer capacitor			

Ref. No.	Part No.	Value.
RESISTORS(VALUE.WATTAGE)		
R101	ERDS2TJ103	10K 1/4
R104	ERDS2TJ102	1K 1/4
R105	ERDS2TJ561	560 1/4
R106	ERDS2TJ562	5.6K 1/4
R107	ERDS2TJ103	10K 1/4
R108	ERDS2TJ271	270 1/4
R201	ERDS2TJ332	3.3K 1/4
R202	ERDS2TJ824	820K 1/4
R203	ERDS2TJ122	1.2K 1/4
R204	ERDS2TJ824	820K 1/4
R205	ERDS2TJ221	220 1/4
R206	ERDS2TJ561	560 1/4
R207	ERDS2TJ822	8.2K 1/4
R208	ERDS2TJ102	1K 1/4
R209	ERDS2TJ471	470 1/4
R211	ERDS2TJ222	2.2K 1/4
R212	ERDS2TJ153	15K 1/4
R213	ERDS2TJ104	100K 1/4
R214	ERDS2TJ824	820K 1/4
R215	ERDS2TJ822	8.2K 1/4
R216	ERDS2TJ563	56K 1/4
R217	ERDS2TJ223	22K 1/4
R218	ERDS2TJ563	56K 1/4
R219	ERDS2TJ223	22K 1/4
R220	ERDS2TJ103	10K 1/4
R221	ERDS2TJ104	100K 1/4
R222	ERDS2TJ473	47K 1/4
R225	ERDS2TJ103	10K 1/4
R227	ERDS2TJ104	100K 1/4
R229	ERDS2TJ102	1K 1/4
R230	ERDS2TJ104	100K 1/4
R231	ERDS2TJ102	1K 1/4
R232	ERDS2TJ122	1.2K 1/4
R233	ERDS2TJ684	680K 1/4
R234	ERDS2TJ103	10K 1/4
R235	ERDS2TJ471	470 1/4
R240	ERDS2TJ152	1.5K 1/4
R247	ERDS2TJ103	10K 1/4
R301	ERDS2TJ393	39K 1/4
R302	ERDS2TJ151	150 1/4
R303	ERDS2TJ223	22K 1/4
R304	ERDS2TJ223	22K 1/4
R305	ERDS2TJ272	2.7K 1/4
R306	ERDS2TJ272	2.7K 1/4
R307	ERDS2TJ562	5.6K 1/4
R308	ERDS2TJ562	5.6K 1/4
R309	ERDS2TJ104	100K 1/4
R311	ERDS2TJ102	1K 1/4
R312	ERDS2TJ153	15K 1/4
R313	ERDS2TJ473	47K 1/4
R314	ERDS2TJ473	47K 1/4
R315	ERDS2TJ103	10K 1/4
R316	ERDS2TJ102	1K 1/4
R317	ERDS2TJ473	47K 1/4
R321	ERDS2TJ153	15K 1/4
R322	ERDS2TJ153	15K 1/4
R325	ERDS2TJ102	1K 1/4
R326	ERDS2TJ102	1K 1/4
R327	ERDS2TJ183	18K 1/4
R702	ERDS2TJ102	1K 1/4
R703	ERDS2TJ271	270 1/4
R704	ERDS2TJ102	1K 1/4
R705	ERDS2TJ271	270 1/4
R710	ERDS2TJ103	10K 1/4
R711	ERDS2TJ563	56K 1/4
R714	ERDS2TJ562	5.6K 1/4
R716	ERDS2TJ101	100 1/4
R717	ERDS2TJ101	100 1/4
R721	ERDS2TJ561	560 1/4
R723	ERDS2TJ271	270 1/4
R725	ERDS2TJ103	10K 1/4
R915	ERDS2TJ821	820 1/4
R916	ERDS2TJ272	2.7K 1/4
R917	ERDS2TJ103	10K 1/4
R918	ERDS2TJ224	220K 1/4
R922	ERDS2TJ821	820 1/4
R923	ERDS2TJ104	100K 1/4
R924	ERDS2TJ332	3.3K 1/4
R925	ERDS2TJ393	39K 1/4
R928	ERDS2TJ102	1K 1/4
R930	ERDS2TJ104	100K 1/4
R931	ERDS2TJ104	100K 1/4
R932	ERDS2TJ104	100K 1/4
R933	ERDS2TJ104	100K 1/4
R937	ERDS2TJ104	100K 1/4
R940	ERDS2TJ473	47K 1/4
R941	ERDS2TJ473	47K 1/4
R942	ERDS2TJ103	10K 1/4
R944	ERDS2TJ223	22K 1/4
R946	ERDS2TJ101	100 1/4
R950	ERDS2TJ563	56K 1/4
R951	ERDS2TJ563	56K 1/4
R952	ERDS2TJ563	56K 1/4
R953	ERDS2TJ563	56K 1/4
R954	ERDS2TJ563	56K 1/4
R960	ERDS2TJ153	15K 1/4
R961	ERDS2TJ473	47K 1/4
CAPACITORS(VALUE.VOLTAGE)		
C101	RCBS1H150JCY	15P 50
C102	RCBS1H150JCY	15P 50
C103	ECBT1H102KB	0.001 50
C104	RCBS1H181KBY	180P 50
C105	ECEA0JU101	100 6.3
C106	ECKD1H103PF	0.01 50
C107	ECKD1H103PF	0.01 50
C108	ECEA25M4R7	4.7 25
C109	ECEA1CU330	33 16
C110	ECBT1H102KB	0.001 50
C111	ECKD1H103PF	0.01 50
C112	ECKD1H103PF	0.01 50
C201	ECKD1H103PF	0.01 50
C202	ECKD1H103PF	0.01 50
C204	RCBS1H181KBY	180P 50
C205	ECKD1H223PF	0.022 50
C206	RCBS1H150JCY	15P 50
C208	ECEA0JU101	100 6.3
C209	ECEA1EK4R7	4.7 25
C210	ECKD1H223PF	0.022 50
C211	ECKD1H223PF	0.022 50
C212	ECKD1H223PF	0.022 50
C213	ECCD1H101K	100P 50
C214	ECEA1CKS100	10 16
C215	ECKD1H103PF	0.01 50

Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.
C216	ECEA1HKR47	0.47 50	C310	ECFTD473KXL	0.047 25	C710	ECKD2H102ZF	0.001 500
C217	ECEA1HK010	1 50	C311	ECQP1471JZ	470P 125	C711	ECKD1H103PF	0.01 50
C220	ECEA1CKS100	10 16	C312	ECEA1CKS100	10 16	C715 ⚠	ECKDKC103PF2	0.01 125
C222	ECFTD473KXL	0.047 25	C313	ECBT1H102KB	0.001 50	C716	ECEA1VU101	100 35
C225	RCBS1H180JCY	18P 50	C314	ECBT1H102KB	0.001 50	C717	ECKD2H102ZF	0.001 500
C226	ECKD1H103PF	0.01 50	C321	ECEA1CKS100	10 16	C718	ECKD1H103PF	0.01 50
C227	ECEA1CKS100	10 16	C323	ECFTD332KXL	0.0033 25	C719	ECEA1VU101	100 35
C230	ECKD1H471KB	470P 50	C324	ECFTD332KXL	0.0033 25	C720	ECKD1H103PF	0.01 50
C301	ECEA1CU101	100 16	C325	ECCD1H330KC	33P 50	C725	ECEA1VK100B	10 35
C302	ECEA1HKR47	0.47 50	C326	ECKD1H103PF	0.01 50	C726	ECEA1VK3R3	3.3 35
C303	ECEA1HK010	1 50	C327	ECBT1H102KB	0.001 50	C902	ECKD1H103PF	0.01 50
C304	ECEA1VK3R3	3.3 35	C701	ECEA1CU222	2200 16	C912	ECEA0JS102	1000 6.3
C305	ECEA1VK3R3	3.3 35	C702	ECEA1EU102	1000 25	C913	ECKD1H103PF	0.01 50
C306	ECEA1VK3R3	3.3 35	C704	ECBT1H102KB	0.001 50	C914	ECEA0JS102	1000 6.3
C307	ECFTD392KXL	0.0039 25	C705	ECEA1CU221	220 16	C915	ECEA1HKR22	0.22 50
C308	ECFTD392KXL	0.0039 25	C706	ECEA1EK4R7	4.7 25	C916	ECCD1H101K	100P 50
C309	ECKD1H103PF	0.01 50	C707	ECKD1H103PF	0.01 50	C917	ECCD1H121K	120P 50
						C927	ECBT1H102KB	0.001 50

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